90-03815/

TECHNICAL PAPER SERIES 11

REHABILITATION PRINCIPLES AND GUIDELINES

BRITISH COLUMBIA Heritage Trust

By:
Robert Lemon

Edited By:
Mary McKinnon

November 1989

Province of
British Columbia
Ministry of
Municipal Affairs,
Recreation and Culture
Honourable Lyall Hanson
Minister

Canadian Cataloguing in Publication Data
Lemon, Robert.
Rehabilitation principles and guidelines

(Technical paper series, ISSN 0229-9976 ; 11)

Bibliography: p.
ISBN 0-7718-8770-1

1. Historic buildings - British Columbia - Conservation and restoration. 2. Historic buildings - British Columbia - Remodeling for other use. I. McKinnon, Mary. II. British Columbia Heritage Trust. IV. Title. V. Series: Technical paper series (British Columbia Heritage Trust) ; 11.

FC3812.L45 1989 363.6'9'09711 C89-092131-8
F1087.8.L45 1989

Titles already published in this series:

1 ***Heritage Conservation Bibliography***
by Janice Bradshaw

2 ***Guidelines for Restoring Brick Masonry***
by Richard Collier

3 ***Manual for the Preparation of "As Found" Drawings***
by Robert Patterson

4 ***Guidelines for Storefronts of Heritage Buildings***
by Richard Collier

5 ***Trees and Towns***
by Heritage Conservation Branch

6 ***Local History in British Columbia***
by Maureen Cassidy

7 ***Fire Prevention in Heritage Buildings***
by Gail Sussman

8 ***Seismic Building Upgrading for Vancouver's Chinatown***
by Erol Karacabeyli and Brenda Wong

9 ***Principles of Heritage Conservation***
by Judy Oberlander, Harold Kalman and Robert Lemon

10 ***Restoration Principles and Procedures***
by Judy Oberlander, Harold Kalman and Robert Lemon

11 ***Rehabilitation Principles and Guidelines***
by Robert Lemon

Technical papers are available at a charge of five dollars per copy for issues 1-8 and ten dollars per copy for issues 9, 10, 11.
Make cheques payable to:
British Columbia Heritage Trust

These papers have been prepared with the intention of providing a convenient reference source, and should not be considered as a substitute for professional or technical advice, but rather a complement to it.

Copies may be requested from:
British Columbia Heritage Trust
Parliament Buildings
Victoria, B.C. V8V 1X4

Foreword

The British Columbia Heritage Trust aims to "support, encourage and facilitate the conservation, maintenance and restoration of heritage property in the Province."

The Technical Paper Series is provided as a resource for all people involved in heritage activities be they volunteers or accredited professionals.

The Trust endeavours to provide information on a range of topics that is important to the development of British Columbia's heritage resources. Your suggestions for further issues in this series are welcomed.

Table of Contents

Introduction 6

1. What is Rehabilitation? 7

2. Principles of Rehabilitation 8

3. The Rehabilitation Process 9

4. Rehabilitation Guidelines 10

- Building Exterior 10
  - Recording and Investigation 10
  - Building Site and Context 11
  - Wood 12
  - Masonry 14
  - Architectural Metals 16
  - Roofs 18
  - Windows 20
  - Entrances and Porches 21
  - Storefronts 22
  - Claddings and Substitute Materials 24
  - Signs and Storefront Awnings 25
  - New Additions to Historic Buildings 26
- Building Interior 27
  - The Structural System 27
  - Interior Spaces, Features and Finishes 28
  - Mechanical Systems 30
  - Energy Retrofitting 31
  - Health, Safety and Building Code Requirements 32

Introduction

This volume is one of a series of manuals developed by the Province of British Columbia to guide heritage conservation work in the province today. For an overview of heritage conservation in general, see the introductory volume, *Principles of Heritage Conservation*.

Rehabilitation Principles and Guidelines deals specifically with the procedures that should be followed to ensure maximum preservation of historic elements in any rehabilitation project. The manual includes a set of conservation and rehabilitation principles that should be used by:

- Architects, contractors and building owners to guide each stage of the rehabilitation process;
- Funding agencies to assess financial assistance applications for projects involving historic building or site rehabilitation;
- Heritage advisory groups, municipal planning staff, building inspectors and provincial agencies to review proposals that call for alterations to buildings or sites of heritage value.

The rehabilitation guidelines presented in Chapter Four expand on and interpret the rehabilitation principles. These guidelines have been developed to ensure that any changes necessary in rehabilitation work are undertaken in the most sensitive way possible to preserve the heritage structure's historic character and features. The guidelines should be considered from the initial planning stage through to project completion.

The British Columbia Heritage Trust would like to thank the following individuals who lent their expertise to this project: Jacqueline Murfitt, Heritage Conservation Office, City of Vancouver; Steve Barber, Senior Planner, City of Victoria; and Patrick Frey and Mark Bawtinheimer of the Heritage Conservation Branch.

The Trust extends special thanks to Alastair Kerr, Heritage Conservation Branch, for his expertise in both the writing and compilation of this work.

1. What is Rehabilitation?

Rehabilitation is one of several approaches that can be taken to heritage conservation work. These approaches — also referred to as levels of intervention — vary according to the extent of the conservation work involved and the degree to which this work affects the historic fabric of the building, structure or site.

In general terms, rehabilitation is defined as the process of returning a property to a useable state through repair or alteration. This process makes possible an efficient contemporary use while preserving those portions and features which are significant to the property's historic, architectural and cultural values.

Rehabilitation can be further defined as either *continued-use rehabilitation* or *adaptive re-use*, depending on the reasons for and nature of the intervention.

Continued-Use Rehabilitation

In this form of rehabilitation, improvements are made to a building that continues to be used for its original purpose. Changes can range from minimal to extensive, depending on the condition of the building, the needs of the owners, and the economics of the project. Changes can include upgrading to meet building and life-safety codes, installation of new electrical and mechanical systems, upgrading to improve access for the handicapped and energy-conservation measures.

In most continued-use rehabilitations, owners have determined that it is economically viable to upgrade rather than move to other premises or demolish the existing building.

Adaptive Re-use Rehabilitation

In this case, a building is converted to a new use when it has outlived its previous function. The interventions described for a continued-use rehabilitation are usually required in an adaptive re-use. With adaptive re-use rehabilitations, however, some modifications to the building may also be required to accommodate the new spatial and circulation needs. In some cases, the term *retrofit* is used to describe the upgrading of a building site feature and/or services as part of an overall rehabilitation program.

In either continued-use or adaptive re-use rehabilitations, the conservation priority is to accommodate change with the least possible impact on the building's historic materials and features.

2. Principles of Rehabilitation

The following principles apply to the rehabilitation of historic buildings and sites in British Columbia. The principles incorporate the six principles of conservation contained in *Principles of Heritage Conservation*, the introductory volume to the Heritage Trust's conservation series.

The principles of conservation and rehabilitation should be followed in the planning and implementation of all rehabilitation projects. They should also be used by heritage groups and municipal and provincial planning agencies to assess and review the proposed rehabilitation of historically and culturally significant heritage buildings or sites in British Columbia.

The conservation and rehabilitation principles are similar in spirit to other widely accepted sets of principles, including those outlined in ICOMOS's *Venice, Burra,* and *Appleton Charters* and the U.S. Secretary of the Interior's *Standards for Rehabilitation*. The principles presented here, however, are directed towards the rehabilitation of British Columbia's built heritage.

General Conservation Principles

- All heritage conservation work, whether it be on a building, monument, or site, should be based upon and preceded by sufficient historical research, site analysis and documentation to identify and safeguard fully the heritage values to be conserved.
- The evolution of the structure(s) and the site should be respected. The contributions of all periods are important to the historical development and merit retention. Decisions about appropriate levels of intervention shall be based upon the heritage values of each contribution.
- Long-term protection of the historic resource should be identified prior to undertaking any work.
- The approach to all heritage conservation projects should be one of minimal intervention to ensure the maximum preservation of the existing and authentic physical fabric and the retention of the signs of age (also known as the patina).
- Conjecture and the falsification of building elements should be avoided in all heritage conservation projects.
- A well-defined maintenance plan should be clearly established in order to prepare for an appropriate level of maintenance and care upon completion.

Specific Rehabilitation Principles

- Whether the rehabilitation involves a continued-use or an adaptive re-use every effort should be made to develop a functional layout which will either not, or which will minimally alter both the exterior appearance and the historic interior layout of the building or structure.
- Wherever possible, deteriorated historic building material and features should be repaired rather than removed or replaced. Where replacement is necessary the new material should be compatible with the material being replaced in composition, design, colour, texture, and other visual qualities, but upon close inspection, it should be distinguishable from the historic fabric.
- Contemporary designs for alterations or new additions may be acceptable. However, they should be compatible with the existing materials and design, yet they must also be seen as products of their own time and be readily distinguishable from the historic fabric.
- Alterations which seek to create an earlier appearance or which use different architectural elements from other buildings or structures are discouraged.

3. The Rehabilitation Process

Most of our historic buildings were intended to fulfill a purpose, whether commercial,institutional or residential. The rehabilitation process continues this tradition by finding appropriate ways to upgrade existing buildings in order to extend their usefulness, while respecting their unique architectural, historic and contextual characteristics.

However, finding new uses and retaining the important aspects of a building's fabric are often at odds: new uses may conflict with the structural, spatial or symbolic nature of an existing building. For example, the conversion of the vaulted nave of a church into residential suites would result in an awkward fit, whereas suites can be quite suitably created within the classrooms of a vacant school. The challenge of the rehabilitation process is to accommodate both the new and the old, and to find creative solutions that respond to the qualities and opportunities afforded by historic interior and exterior spaces.

In order to meet this challenge, the conservation and rehabilitation principles must be integrated into any redevelopment plan or proposal. The redevelopment process requires that various phases of any project be clearly and thoroughly planned. The principles and following guidelines will assist in the planning stages of the project and can be used as a handy reference throughout the course of all redevelopment.

A redevelopment plan is usually prepared by the owner and the design professional (architect and/or engineer) in consultation with the local planning authorities. The phases of such a plan, taking into account the requirements for rehabilitation, often include the following:

1. Start up: review of rehabilitation standards and guidelines; legal description; ownership; zoning; determine proposed uses; potential financing; initial research; prioritization of work.

2. Stabilization and protection: safety of building and public; emergency repair and bracing; protection of valuable material from decay and damage during rehabilitation.

3. Research, recording and documentation: as-found documentation and photos; historic research.

4. Programming and design: understanding of a building's opportunities and limitations; integration of new services; handicapped access.

5. Approvals and permits: documentation of proposed alterations and conservation work to satisfy standards for rehabilitation; building code.

6. Budget and work schedule: arrange financing, audit control systems, timing, phasing and sequencing of work to be done.

7. Tendering and contracts: prepare contract documentation; accept bids; write final contracts to coincide with the work schedule.

8. Conservation, repair and construction: implement the project; supervise the work undertaken; document the changes made; pay out the contractors.

9. Cyclical maintenance program: institute a regular program of conservation maintenance.

4. Rehabilitation Guidelines

The guidelines which follow have been prepared to expand on the rehabilitation principles and to aid in the rehabilitation of heritage buildings in British Columbia. The guidelines and format are modelled on the U.S. Secretary of the Interior's *Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings.*

The various building components, materials and systems encountered in rehabilitation projects are grouped into exterior and interior subject headings. For each subject, a set of recommended procedures is outlined in sequence from least intervention to most. It is important to note that the sequence of procedures must be followed in this order to ensure that actions of minimal intervention — that is protection and maintenance — are carried out before measures that entail more change and alteration of historic material.

Some specific measures are listed as **Not Recommended** as these can cause serious damage to and loss of historic material and character.

References for additional technical information are listed at the end of each section.

Building Exterior

Recording and Investigation

Before work commences, it is imperative to have a thorough record of the building's history and current condition.

The scope of the recording will be determined by the scale of the project and the extent of the rehabilitation. As-found drawings (done by hand with tapes and levels) of plans, elevations, sections and details can be supplemented by hand-held photos or more accurate photogrammetric (scaleable) documentation. These photos are often useful in outlining and specifying the rehabilitation work.

Part of the recording process involves inspecting and investigating the building's exterior and interior systems, components, materials and details. This investigation will determine the requirements for subsequent rehabilitation work and provide a list of structural and material problems that need to be resolved.

Further Reading

British Columbia Heritage Trust. *Manual for the Preparation of 'As Found Drawings'.* Technical Paper Series 3 prepared by Robert Patterson. Victoria, B.C.: B.C. Heritage Trust, 1982.

Historic Structure Reports, *APT Bulletin.* Vol. XIV No. 4. Ottawa, Ont.: Association for Preservation Technology, 1982.

U.S. Department of the Interior. *Rectified Photography and Photo Drawings for Historic Preservation.* Prepared by J. Henry Chambers, AIA. Washington, D.C.: Preservation Assistance Division, National Park Service, 1973.

Building Site and Context

The relationship between a historic building or buildings and landscape features within a property's boundaries helps to define historic character and should be considered in rehabilitation project planning.

Assessment

Buildings and their features as well as site features that are important in defining overall historic character should be recorded, inspected, retained and conserved. Site features can include driveways, walkways, lighting, fencing, signs, garden features and vegetation, ditches and archaeological features.

The historic relationship between buildings, landscape features and open space should be retained

Maintenance

Buildings and site features should be protected and maintained by providing proper drainage to prevent erosion of the site and the building materials.

Protection from arson and vandalism should be provided for vacant structures that are awaiting rehabilitation.

Archaeology

Site disturbance should be kept to a minimum where archaeological sites are present. Professional archaeological assistance is recommended for sites containing significant material.

Not Recommended

- **Removing or relocating historic buildings or landscape features, thus destroying the historic relationship between buildings, landscape features and open space.**
- **Moving buildings onto the site, thus creating a false historical appearance.**
- **Lowering the grade adjacent to a building, or raising the building to permit development of a formerly below-graded area such as a basement in a manner that would drastically change the relationship of the building to the site.**

Further Reading

British Columbia Heritage Trust. *Trees and Towns: Issues and Methods in Protecting Heritage and Community Trees in B.C.* Technical Paper Series 5 prepared by Dave Harper. Victoria, B.C.: B.C. Heritage Trust, 1983.

Favretti, Rudy J. and Favretti, Joy Putnam. *Landscapes and Gardens for Historic Buildings: A Handbook for Reproducing and Creating Authentic Landscape Settings.* Nashville, Tenn.: American Association for State and Local History, 1978.

"Landscape Preservation". *APT Bulletin.* Vol. XV No. 4. Ottawa, Ont.: Association for Preservation Technology, 1983.

U.S. Department of the Interior, *Preservation Brief 17: Architectural Character: Identifying the Visual Aspects of Historic Buildings as an Aid to Preserving Their Character.* Prepared by Lee H. Nelson, FAIA, 1988, Washington, D.C. National Park Service, Preservation Assistance Division.

❖ **Wood:** clapboard, weatherboard, shingles, and other wooden siding and decorative elements

Because it can be easily shaped by sawing, planing, carving, and gouging, wood is the most commonly used material for architectural features such as clapboards, cornices, brackets, entablatures, shutters, columns and balustrades.

These wooden features — both functional and decorative — can be important in defining the historic character of the building. Their retention, protection and repair are therefore of particular importance in rehabilitation projects. For specific guidance, consult the references at the end of this section.

The recommended procedures should be followed in this sequence: assessment, maintenance, preservatives, paints and coatings, repair and replacement. Repair and replacement should be considered only after previous measures have been followed.

✧ Assessment

Wood features that are important in defining the overall historic character of the building. These features can include siding, cornices, brackets, window architraves, and doorway pediments; and their paints, finishes, and colours should be recorded, inspected, retained and conserved.

✧ Maintenance

Maintenance and protection measures should be adopted to eliminate sources of deterioration. This includes providing proper drainage so that water is not allowed to stand on flat, horizontal surfaces or accumulate in decorative features. Faulty flashings, leaking gutters, cracks and holes in siding, deteriorated caulking in joints and seams should be repaired. Work should also include the inspection and treatment of insect and fungal biodeterioration and problems resulting from vegetation growing adjacent to wood.

✧ Preservatives

Chemical preservatives should be applied to wood features such as beam ends or outriggers that are exposed to decay hazards and are traditionally unpainted. Creosote-based preservatives can change the appearance of the wood and should be avoided unless used historically.

✧ Paints and Coatings

Coatings such as paint that help protect the wood from moisture and ultraviolet light should be retained. Paint removal should be considered only where there is paint surface deterioration or as part of an overall maintenance program if it involves repainting or applying other appropriate protective coatings. Stripping paint or other coatings to reveal bare wood exposes historically coated surfaces to accelerated weathering.

Painted wood surfaces should be inspected to determine whether repainting is necessary or if cleaning is all that is required.

Removal of damaged or deteriorated paint should be done only to the next sound layer and with the gentlest method possible (handscraping and handsanding); then repaint. Destructive paint removal methods such as propane or butane torches, sandblasting or waterblasting can irreversibly damage historic woodwork.

When paint is so deteriorated that total removal is necessary prior to repainting, electric hot-air guns should be used with care on decorative wood features (as should electrical heat plates on flat wood surfaces). Improper use can scorch historic woodwork.

Chemical strippers are useful, primarily as supplements to other methods such as handscraping, handsanding and the recommended thermal devices. Detachable wooden elements such as shutter doors and columns may — with the proper safeguards — be chemically dip-stripped. Care should be taken to neutralize the wood thoroughly after using chemicals so that new paint will adhere. Extended soaking in caustic solutions can raise the grain and roughen the surface of wooden members.

Proper surface preparations should precede the application of compatible paint coating systems.

Colours that are appropriate to the historic building and district should be used when repainting.

The overall condition of the wood should be inspected to determine whether more than protection and maintenance are required — that is, if repairs to wood features will be necessary.

✧ Repairing

Wood features should be repaired by patching, piecing-in, consolidating, or otherwise reinforcing the wood using recognized preservation methods. Repair may also include the limited replacement in kind — or with compatible substitute material — of those extensively deteriorated or missing parts or features where there are surviving prototypes such as brackets, mouldings or sections of siding.

✧ Replacement

Where an entire wood feature is too deteriorated to repair — if the overall form and detailing are still evident — it could be replaced using the physical evidence to guide the new work. Examples of wood features include a cornice, entablature or balustrade. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered. An unrepairable feature that is removed should be replaced and such replacement should convey the same visual appearance as the original.

Not Recommended

- **Removing or radically changing wood features which are important in defining the overall historic character of the buildings .**
- **Removing a major portion of the historic wood from a facade instead of repairing or replacing only the deteriorated wood, then reconstructing the facade with new material in order to create a uniform or "improved" appearance.**
- **Radically changing the type of finish or its colour or accent scheme so that the historic character of the exterior is diminished.**
- **Stripping historically painted surfaces to bare wood, then applying clear finishes or stains in order to create a "natural look".**
- **Stripping paint or varnish to bare wood rather than repairing or reapplying a special finish (eg. painted grained finishes).**
- **Applying substitute materials (eg. vinyl or metal siding, soffits, trim, etc. in lieu of repair or replacement of wooden components.**

Further Reading

Scheffer, T.C. and Verrall, A.F. *Principles for Protecting Wood Buildings from Decay.* USDA Forest Service Research Paper FPL 190. Madison, Wisc.: U.S. Department of Agriculture, 1973.

Szabo, T. and Shields, J.K. "Simple Remedial Treatment of Deteriorated Wood in Heritage Homes." *APT Bulletin.* Vol. XI No. 2. Ottawa, Ont.: Association for Preservation Technology, 1979.

U.S. Department of the Interior, National Park Service, Preservation Assistance Division, Technical Preservation Services, Washington, D.C. publications:

Epoxies for Wood Repairs in Historic Buildings. Prepared by Morgan W. Phillips and Dr. Judith E. Selwyn. 1978.

Preservation Brief 8: Aluminum and Vinyl Siding on Historic Buildings: The Appropriateness of Substitute Materials for Resurfacing Historic Wood Frame Buildings. Prepared by John. H. Myers, 1984.

Preservation Brief 10: Exterior Paint Problems on Historical Woodwork. Prepared by Kay D. Weeks and David W. Look, AIA. 1982.

Preservation Brief 16: The Use of Substitute Materials on Historic Building Exteriors, Prepared by Sharon C. Park, AIA, 1988.

❖ Masonry: brick, stone, terra cotta, concrete, stucco, mortar

Masonry features can be important in defining the historic character of the building. These features can include brick cornices and door pediments, stone window architraves, terra cotta brackets and railings as well as masonry surfaces (modelling, tooling, bonding patterns, joint size, and colour).

It should be noted that while masonry is among the most durable of historic building materials, it is also the most susceptible to damage by improper maintenance or repair techniques and by harsh or abrasive cleaning methods. Most preservation guidance on masonry thus focuses on such concerns as cleaning and the process of repointing. Reference documents are listed at the end of this section for further technical information on masonry.

These recommended procedures should be followed in this sequence: assessment, maintenance, cleaning, repointing, repair and replacement. Repair and replacement should be considered only after the previous measures have been followed.

✧ Assessment

Masonry features that are important in defining the overall historic character of the building—wall surfaces (brick or stone unit and joint size, tooling and bonding patterns), brackets, railings, cornices, window architraves, door pediments, steps, and columns, for example —and their coatings and colour should be recorded, inspected, retained and conserved.

✧ Maintenance

Maintenance and protection measures should be adopted to eliminate sources of deterioration and to provide proper drainage so that water does not stand on flat, horizontal surfaces or accumulate in curved decorative features.

✧ Cleaning

Masonry should be cleaned only when it is necessary to halt deterioration or remove heavy soiling and not solely to achieve a "new" look.

Masonry surface cleaning tests should be done after it has been determined that such cleaning is necessary. Tests should be observed over a sufficient period of time so that both the immediate effects and the long-range effects are know. This will enable selection of the gentlest, most effective method.

Masonry surfaces should be cleaned with the gentlest method possible, such as low pressure water and detergents, using natural bristle brushes. These measures will prevent unnecessary chemical or abrasive damage to masonry surfaces. Manufacturer's recommendations should be followed for safety and weather precautions (particularly in cold weather). Acid cleaners should not be used on limestone or marble. Chemical products should not be left on masonry and proper care is necessary to protect adjacent material, vegetation and the public.

✧ Paint

Painted masonry surfaces should be inspected to determine whether repainting is necessary. Paint that is firmly adhered to masonry surfaces and is part of the historic character should be left in place as it provides a protective coating.

Where paint is to be removed, it should be removed only to the next sound layer. Use the gentlest method possible (e.g., handscraping) prior to repainting and avoid methods that are damaging to the surface such as sandblasting, caustic solutions and high-pressure waterblasting.

Compatible paint coating systems should be applied following proper surface preparation. Manufacturer's recommendations should be followed.

Where repainting is required, do so with colours that are historically appropriate to the building and district.

Once cleaning procedures are complete the overall condition of the masonry can be determined and the need for further protection and maintenance work, as well as possible repairs to the masonry features, identified.

◇ Repointing

Masonry walls and other masonry features should be repaired by repointing the mortar joints where there is evidence of deterioration such as disintegrating mortar, cracks in mortar joints, loose bricks, damp walls, or damaged plasterwork. This work should be limited to only what is necessary and should not include removal or repointing of sound material.

Deteriorated mortar should be removed by carefully hand-raking the joints to avoid damaging the masonry. Power tools and saws can damage masonry.

Repointing should be done with mortar which duplicates the old mortar in strength, composition, colour, and texture. The use of Portland cement (where not evident in the old mortar or in proportions in excess of that of the old mortar) can damage the masonry by creating a bond that is stronger than the historic material and which may damage the surrounding masonry.

The old mortar joints should be duplicated in width and in joint profile and be done using traditional repointing techniques. Synthetic caulking compounds and "scrub" coating repointing techniques are discouraged.

Stucco surfaces should be repaired by removing the damaged material and patching with new stucco that duplicates the old in strength, composition, colour and texture.

◇ Repairing

Where repair is necessary to masonry features it should be done by patching, piecing-in, or consolidating the masonry using recognized preservation methods. Repair may also include the limited replacement in kind — or with compatible substitute material — of those extensively deteriorated or missing parts of masonry features when there are surviving prototypes. Examples of this include terra-cotta brackets or stone balusters. Extensive and unnecessary repair work is discouraged as is the use of inappropriate substitute materials (either visually or chemically incompatible).

New non-historic surface treatments such as water-repellent coatings should be used on masonry only after repointing and only if masonry repairs have failed to arrest water penetration problems. Care must be taken to allow interior moisture to escape in walls with surface coatings as the coating may trap water within the masonry and cause surface deterioration. Coatings may also discolour the masonry. Stucco is not recommended as an alternative to proper repair and repointing of masonry surfaces.

◇ Replacement

An entire masonry feature should be replaced if it is too deteriorated to repair and if the overall form and detailing are still evident to guide the new work. Examples can include large sections of a wall, a cornice, balustrade, column, or stairway. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

Not Recommended

- **Removing or radically changing masonry features that are important in defining the overall historic character of the building.**
- **Replacing or rebuilding a major portion of exterior masonry walls that could be repaired so that, as a result, the building is no longer historic and is essentially new construction.**
- **Applying paint or other coatings such as stucco to masonry that has been historically unpainted or uncoated in order to create a new or "improved" appearance.**
- **Removing paint from historically painted masonry. Radically changing the type of paint or coating or its colour.**
- **Cleaning where unnecessary and using damaging techniques such as sandblasting, high-pressure water washing and acids.**

Further Reading

Berryman, Nancy D. and Tindall, Susan M. *Terra Cotta*. Chicago, Ill.: Landmarks Preservation Council of Illinois, 1984.

British Columbia Heritage Trust. *Guidelines for Restoring Brick Masonry*. Technical Paper Series 2 prepared by Richard Collier. Victoria, B.C.: B.C. Heritage Trust, 1981.

Friends of Terra Cotta newsletters (1981-present) contain many articles on terra cotta preservation. Mailing address: P.O. Box 421393 Main Post Office, San Francisco, CA. 94142.

McKee, Harley J. *Introduction to Early American Masonry: Stone, Brick, Mortar and Plaster*. Washington, D.C.: The Preservation Press, 1973.

Ontario Ministry of Citizenship and Culture. *Annotated Master Specifications for the Cleaning and Repointing of Historic Masonry*. Toronto, Ont.: Queen's Park Printer for Ontario, 1985.

U.S. Department of the Interior, National Park Service, Preservation Assistance Division, Technical Preservation Services, Washington, D.C. publications:

Glossary of Historic Masonry Deterioration Problems and Preservation Treatments. Prepared by Anne E. Grimmer. 1984.

Moisture Problems in Historic Masonry Walls: Diagnosis and Treatment. Prepared by Baird M. Smith AIA. 1986.

Preservation Brief 2: Repointing Mortar Joints in Historic Buildings. Prepared by Robert C. Mack. 1980.

Preservation Brief 6: Dangers of Abrasive Cleaning To Historic Buildings. Prepared by E. Grimmer, 1979.

Preservation Brief 7: The Preservation of Historic Glazed Architectural Terra-Cotta. Prepared by de Teel Patterson Tiller. 1979.

Preservation Brief 15: Preservation of Historic Concrete: Problems and General Approaches. Prepared by William B. Coney, AIA.

❖ Architectural Metals: cast iron, steel, pressed tin, copper, aluminum and zinc

Architectural metal features — such as cast-iron facades, porches, and steps; sheet metal cornices, roofs, roof cresting and storefronts; and cast or rolled metal doors, window sash, entablatures and hardware — are often highly decorative and may be important in defining the overall historical character of the building. Their retention, protection and repair should be a prime consideration in rehabilitation projects.

The recommended procedures should be followed in this sequence: assessment, maintenance, cleaning, paints and coatings, repairing and replacement. Repair and replacement should be considered only after the previous procedures have been completed.

✧ Assessment

Architectural metal features — columns, capitals, window hoods or stairways, for example — and their finishes and colours that are important in defining the overall historic character of the building should be recorded, inspected, retained and conserved.

✧ Maintenance

Maintenance and protection measures should be adopted to eliminate sources of deterioration and corrosion. These measures should include providing proper drainage so that water does not stand on flat, horizontal surfaces or accumulate in curved, decorative features. Leaking roofs and gutters should be repaired. Incompatible metals should not be placed together without providing a reliable separation material; this incompatibility can result in galvanic corrosion of the less noble metal (eg. copper will corrode cast iron, steel, tin and aluminum).

✧ Cleaning

Architectural metals should be cleaned, when necessary, to remove corrosion prior to repainting or applying other appropriate protection coatings. Care should be taken not to expose metals that were intended to

be protected from the environment. Similarly, metals such as copper, bronze or stainless steel that were intended to be exposed, should not be painted or coated.

The particular type of metal should be inspected prior to any cleaning procedure and then tested to ensure that the gentlest cleaning method possible is selected. This inspection may determine that cleaning is inappropriate for the particular metal. The historic colour, texture and finish of the metal should not be altered or damaged by inappropriate or harsh cleaning measures. The patina of historic metal should not be removed in the process since this patina may provide a protective coating on some metals such as bronze or copper as well as being a characteristic of the historic finish.

Soft metals such as lead, tin, copper, terneplate and zinc should be cleaned with appropriate chemical methods since their finishes can be abraded by blasting methods.

For hard metals — cast iron, wrought iron, and steel — use the gentlest cleaning method possible to remove paint buildup and corrosion. If handscraping and wire brushing have proven ineffective, low-pressure dry-grit blasting may be used as long as it does not abrade or damage the surface.

✧ Paints and Coatings

Appropriate paint or other coating systems should be applied after cleaning in order to decrease the corrosion rate of metals or alloys.

Repainting should be done with colours that are appropriate to the historic building or district.

Appropriate protective coatings should be applied, such as lacquer, to an architectural metal feature (eg. bronze doors or hardware) which is subject to heavy pedestrian use. Consider the potential maintenance requirements caused by new (or heavy) uses, environmental salts or by the use of salts on adjacent sidewalks.

The overall condition of the architectural metals should be evaluated to determine whether more than protection and maintenance are required — that is, if repairs to features will be necessary.

✧ Repairing

Architectural metal features should be repaired, when necessary, by patching, splicing or otherwise reinforcing the metal following recognized preservation methods. Repairs may also include the limited replacement in kind — or with a compatible substitute material — of those extensively deteriorated or missing parts of features when there are surviving prototypes. Examples can include porch balusters, column capitals or bases or cresting. Replacement of entire components should not be considered when limited repair is feasible.

✧ Replacement

An entire architectural metal feature that is too deteriorated to repair could be replaced if the overall form and detailing are still evident to guide the new work. Examples could include cast iron porch steps or steel sash windows. If using the same kind of material is not technically or economically feasible, then a compatible material may be considered. Care should be taken to avoid replacement parts that do not convey the visual appearance of the surviving parts of the architectural metal feature or that are physically or chemically incompatible. Metal features that are unrepairable should not be removed unless they are to be replaced.

Not Recommended

- **Removing or radically changing architectural metal features which are important in defining the overall historic character of the building.**
- **Removing a major portion of the historic architectural metal from a facade instead of repairing or replacing only the deteriorating metal, then reconstructing the facade with new material in order to create a uniform or "improved" appearance.**
- **Radically changing the type of finish or its historic colour or accent scheme.**

Further Reading

U.S. Department of the Interior. *Metals in America's Historic Buildings: Uses and Preservative Treatment*. Part I. A historical Survey of Metals prepared by Margot Gayle and David W. Look AIA; Part II. Deterioration and Methods of Preserving Metals prepared by John G. Waite. Washington, D.C.: Preservation Assistance Division, National Park Service, 1980.

Roofs

The roof, including its shape, the size, colour, and patterning of the roofing material, and features such as cresting, dormers, cupolas, and chimneys, can be extremely important in defining the building's overall historic character. In addition to its design role, a weathertight roof is essential to the preservation of the entire structure; thus, protecting and repairing the roof as a "cover" is a critical aspect of every rehabilitation project.

The recommended procedures should be followed in this sequence: assessment, maintenance, repairing and replacement; repair and replacement should be considered only after the previous measures have been followed.

Assessment

Roofs, including all functional and decorative features that are important in defining the overall historic character of the building should be recorded, inspected, retained and conserved. This includes the shape of the roof — hipped, gambrel or mansard, for example — decorative features such as cupolas, cresting, chimneys and weathervanes and roofing material such as wood, metal, clay tile and slate, as well as its size, colour and patterning.

Maintenance

Maintenance procedures should be adopted that include cleaning the gutters and downspouts and replacing deteriorated flashing. Roof sheathing should also be checked for proper venting to prevent moisture, condensation and water penetration and to ensure that materials are free from insect infestation.

Adequate anchorage for roofing material should be ensured to guard against wind damage and moisture penetration.

A leaking roof should be protected with plywood and building paper until it can be properly repaired.

◇ **Repairing**

Roof repairs should reinforce historic materials. Repairs will also generally include the limited replacement in kind — or with compatible substitute material — of those extensively deteriorated or missing parts or features when there are surviving prototypes. Examples could include cupola, louvers, dentils, dormer roofing, or wood shingles, shakes, tiles or slates on a main roof. Replacement of entire roof features, such as cupolas of dormers, is not recommended if repair is feasible.

Substitute materials that do not convey the visual appearance of the surviving parts of the roof or that are physically or chemically incompatible are not recommended.

◇ **Replacement**

An entire feature of the roof that is too deteriorated to repair could be replaced if the overall form and detailing are still evident to guide the new work. Examples can include a large section of roofing, or a dormer of chimney. If using the same kind of material is not technically or economically feasible then a compatible substitute material may be considered.

If a feature of the roof, such as a chimney or domer, is unrepairable, it should be removed and replaced with a new feature that conveys the same visual appearance.

Not recommended

- **Radically changing, damaging or destroying roofs which are important in defining the overall historic character of the building.**
- **Removing a major portion of the roof or roofing material that is repairable; then reconstructing it with new material in order to create a uniform or "improved" appearance.**
- **Changing the configuration of a roof by adding new features — dormer windows, vents or skylights, for example — that diminish historic character; new roof features (skylights, vent stacks, chimneys) should be located away from view of the front or public right-of-way.**
- **Stripping the roof of sound historic material such as wood, architectural metal, clay tile or slate.**
- **Applying paint or other coatings to roofing material which was uncoated historically.**

Further Reading

Historic roofing issue. *APT Bulletin.* Vol. 2 No. 1-2. Ottawa, Ont.: Association for Preservation Technology, 1970.

U.S. Department of the Interior. *Preservation Brief 4: Roofing for Historic Buildings.* Prepared by Sarah M. Sweetser. Washington, D.C. Technical Preservation Services Division, Office of Archaeology and Historic Preservation/Heritage Conservation and Recreation Services, 1978.

Western Red Cedar Shingles and Shakes: A Handbook of Good Practice. Vancouver, B.C.: Council of Forest Industries of British Columbia, 1980.

See also: References for Architectural Metals and Wood.

Windows

A highly decorative window with an unusual shape, glazing pattern or colour is most likely identified immediately as a character-defining feature of the building. It is far more difficult, however, to assess the importance of repeated windows on a facade, particularly if they are individually simple in design and material, such as the large, multi-paned sash of many industrial buildings. Because rehabilitation projects frequently include proposals to replace window sash or even entire windows to improve thermal efficiency or to create a new appearance, it is essential that their contribution to the overall historic character of the building along with their physical condition be assessed before specific repair or replacement work is undertaken.

The recommended procedures should be followed in this sequence: assessment, maintenance, repairing and replacement. Repair and replacement should be considered only after the previous measures have been followed.

Assessment

Windows — and their functional and decorative features — that are important in defining the overall historic character of the building should be recorded, inspected, retained and conserved. Such features can include frames, sash, muntins, glazing sills, heads, hoodmolds, panelled or decorated jambs and mouldings, interior and exterior shutters and blinds.

Maintenance

The wood and architectural metal which comprise the window frame, sash, muntins and surrounds should be protected and regularly maintained through appropriate surface treatments such as cleaning, rust removal, limited paint removal and re-application of protective coating systems.

Windows should be made weathertight by re-caulking and replacing or installing weatherstripping. These actions also improve thermal efficiency.

The overall condition of materials should be evaluated to determine whether more than protection and maintenance are required — that is, if repairs to windows and window features will be required.

Repairing

Window frames and sash should be repaired, where necessary, by patching, splicing, consolidating or otherwise reinforcing. Such repair may also include replacement in kind of those parts that are either extensively deteriorated or are missing when there are surviving prototypes such as architraves, hoodmoulds, sash, sills and interior or exterior shutters or blinds. Serviceable window hardware such as brass lifts and sash locks should be re-used. Substitute materials and replacement parts should convey the visual appearance of the surviving parts of the window and should be physically and chemically compatible.

Replacement

An entire window that is too deteriorated to repair — if the overall form and detailing are still evident — could be replaced, using the physical evidence to guide the new work. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

Not Recommended

- **Removing or radically changing windows which are important in defining the overall historic character of the building.**
- **Changing the number, location, size or glazing pattern of windows, through cutting new openings, blocking-in windows and installing replacement sash which do not fit the historic window opening.**
- **Changing the historic appearance of windows through the use of inappropriate designs, materials, finishes or colours which radically change the sash, depth of reveal and muntin configuration; the reflectivity and colour of the glazing; or the appearance of the frame.**

- **Obscuring historic window trim with metal or other material.**
- **Stripping windows of historic material such as wood, iron, cast iron and bronze.**

Further Reading

"Next window, please." Technics: Replacement Windows. *Progressive Architecture*. August, 1984.

U.S. Department of the Interior, National Park Service, Preservation Assistance Division, Technical Preservation Services, Washington, D.C. publications:

Improving Thermal Efficiency: Historic Wooden Windows. Preservation Case Study. 1982.

Interpreting the Secretary of the Interior's Standards for Rehabilitation. 2 Vols, 1985.

Preservation Brief 9: The Repair of Historic Wooden Windows. Prepared by John H. Myers, 1981.

Preservation Brief 13: The Repair and Thermal Upgrading of Historic Steel Windows. Prepared by Sharon C. Park, 1984.

See also: References for Wood, Architectural Metals and Energy Retrofitting.

Entrances and Porches

Entrances and porches, particularly those on primary elevations, are quite often the focus of heritage buildings. Together with their functional and decorative features such as doors, steps, balustrades, pilasters, and entablatures, they can be extremely important in defining the overall historic character of a building. Their retention, protection, and repair should always be carefully considered when planning rehabilitation work.

The recommended procedures should be followed in this sequence: assessment, maintenance, repairing and replacement. Repair and replacement should be considered only after the previous measures have been followed.

Assessment

Entrances and porches and their functional and decorative features that are important in defining the overall historic character of the building should be recorded, inspected, retained and conserved. Examples include doors, fanlights, sidelights, pilasters, entablatures, columns, balustrades, and stairs.

Maintenance

The masonry, wood and architectural metal that comprise entrances and porches should be protected and regularly maintained through appropriate surface treatments such as cleaning rust removal, limited paint removal and re-application of protective coating systems.

The overall condition of materials should be evaluated to determine whether more than protection and maintenance are required — that is, if repairs will be necessary.

The repair of entrances and porches should include reinforcement of historic materials. Repair will also generally include the limited replacement in kind — or with compatible substitute material — of those extensively deteriorated or missing parts of repeated features where there are surviving prototypes. Examples include balustrades, cornices, entablatures, columns, sidelights and stairs. Avoid using substitute materials as replacement parts that do not convey the

visual appearance of the surviving parts or are physically or chemically incompatible. Components that are repairable should not be replaced.

✧ Replacement

An entire entrance or porch that is too deteriorated to repair — if the form and detailing are still evident — could be replaced using the physical evidence to guide the new work. If using the same kind of material is not technically or economically feasible, then a compatible substitute may be considered. An entrance porch that is unrepairable should not be removed if it is not to be replaced, nor should it be replaced with one that does not convey the same visual appearance.

Not Recommended

- **Removing or radically changing entrances and porches which are important in defining the overall historic character of the building.**
- **Stripping entrances and porches of historic materials such as wood, iron, cast iron, terra cotta, tile and brick.**
- **Removing an entrance or porch because the building has been re-oriented to accommodate a new use.**
- **Cutting new entrances on a primary elevation.**
- **Altering utilitarian or service entrances so they appear to be formal entrances by adding non-characteristic embellishments such as panelled doors, fanlights and sidelights.**
- **Enclosing porches in a manner that detracts from their depth and character or creates an appearance radically different from the original.**

Further Reading

U.S. Department of the Interior. *Interpreting the Secretary of the Interior's Standards for Historic Preservation Projects.* Washington, D.C.: Technical Preservation Services, Preservation Assistance Division, National Park Service, 2 Vols, 1985.

See also: References for Masonry, Wood and Architectural Metals.

❖ Storefronts

Storefronts are quite often the focus of historic commercial buildings and thus can be extremely important in defining the overall historic character. Because storefronts also play a crucial role in a store's advertising and merchandising strategy, they are often altered to meet the needs of a new business. Particular care is required in planning and implementing rehabilitation work on storefronts to preserve the building's historic character.

The recommended procedures should be followed in this sequence: assessment, maintenance, repairing and replacement. Repair and replacement should be considered only after the previous measures have been followed.

✧ Assessment

Storefronts and the functional and decorative features that are important in defining the overall historic character of the building should be recorded, inspected, retained and conserved. Examples include display windows, signs, doors, transoms, kick plates, corner posts and entablatures.

✧ Maintenance

Masonry, wood and architectural metals should be protected and maintained through appropriate treatments such as cleaning, rust removal, limited paint removal and re-application of protective coating systems. Historic material such as wood, cast iron, terra cotta, carrara glass, ceramic tile and brick should not be stripped.

Storefronts should be protected against arson and vandalism before work begins by boarding up windows and installing alarm systems that are keyed into local protection agencies. Exposure to weather and vandalism could result in damage to interior features and finishes.

The overall condition of storefront materials should be evaluated to determine whether more than protection and maintenance are required — that is, if repairs will be necessary.

✧ Repairing

Storefronts should be repaired by reinforcing the historic materials. Repairs will also generally include the limited replacement in kind — or with compatible substitute material — of those extensively deteriorated or missing parts of the storefront where there are surviving prototypes such as transoms, kick plates, pilasters or signs. The use of substitute materials that do not convey the same visual appearance as the surviving parts or that are physically or chemically incompatible are not recommended. A storefront that could be repaired should not be replaced.

✧ Replacement

An entire storefront that is too deteriorated to repair could be replaced if the overall form and detailing are still evident to guide the new work. If using the same material is not technically or economically feasible, then compatible substitute materials may be considered. A storefront that is unrepairable should not be removed and not replaced, nor should it be replaced with one that does not convey the same visual appearance.

Not Recommended

- **Removing or radically changing storefronts— and their features — which are important in defining the overall historic character of the building.**
- **Changing the storefront so that it appears residential rather than commercial in character.**
- **Removing material to create a recessed arcade.**
- **Changing the location of the main entrance.**
- **Introducing decorative elements of dubious origin.**

Further Reading

British Columbia Heritage Trust. *Guidelines for Storefronts for Heritage Buildings.* Technical Paper Series 4 prepared by Richard Collier. Victoria, B.C.: B.C. Heritage Trust, 1982.

Roger Du Toit Architects. *Planning and Design for Commercial Facade Improvements.* Toronto, Ont.: Ministry of Municipal Affairs, 1985.

U.S. Department of the Interior, National Park Service, Preservation Assistance Division, Technical Preservation Services, Washington, D.C. publications:

Interpreting the Secretary of the Interior's Standards for Rehabilitation. 2 Vols, 1985.

Preservation Brief 11: The Preservation of Historic Storefronts. Prepared by H. Ward Jandl, 1982.

Preservation Brief 12: The Preservation of Historic Pigmented Glass (Vitrolite and Cararra Glass). 1984.

See also: Masonry, Wood, Architectural Metals, Windows, Porches and Entrances, and Signs and Storefront Awnings.

Claddings and Substitute Materials

A building's character is defined by a combination of its details, shape, style and materials. There is a tendency with wooden buildings which have not been properly maintained, to clad deteriorated material with replacement siding. Other details and components which have deteriorated beyond repair and are difficult to replace, such as glazed terra cotta, are sometimes replaced with a substitute material. Before either of these actions are taken a thorough review of preservation methods and the consequences of these actions should be undertaken.

Claddings

The installation of vinyl or aluminum cladding is not recommended in lieu of proper repair of character-defining wooden cladding and details. These materials usually obscure important details and materials and radically alter the appearance of historic buildings.

Damage is usually caused to underlying details during the installation of surface claddings. Condensation trapped inside such claddings can rapidly deteriorate the wooden structure.

Claddings can conceal the signs of other conservation problems and hasten their development.

Substitute Materials

Careful consideration should be given to the use of substitute materials on historic buildings, particularly where character-defining details are to be replaced.

Substitute materials such as fibreglass, epoxies and other plastics have weathering and colour-retention properties different from adjacent historic materials. Testing of such properties is important before deciding to use modern substitute materials.

Further Reading

Conway, Brian D. "The Case Against Substitute Siding." *Old House Journal, Vol VIII No. 4.* Brooklyn, N.Y., April, 1980. (available from Heritage Society of B.C.)

U.S. Department of the Interior, National Park Service, Preservation Assistance Division, Technical Preservation Services, Washington, D.C. publications

Preservation Brief 8: Aluminum and Vinyl Siding on Historic Buildings. 1984.

Preservation Brief 16: The Use of Substitute Materials on Historic Building Exteriors. Prepared by Sharon C. Park AIA, 1988.

Signs and Storefront Awnings

Signage and awnings, particularly on buildings in commercial districts, make a significant contribution to the character of historic buildings and districts. Altering existing signage or awnings that may be character-defining should only be done after a thorough assessment of their condition, historic value.

Signs

Existing character-defining signs, including historic painted advertising often found on the sides of older commercial buildings should be preserved where possible. This is particularly important when the building is being used for its original purpose by its original owner.

Inappropriate illuminated signage, particularly back-lit plastic panels, should be carefully removed so that underlying historic signage may be preserved.

Where new signage is required, it should be of a type and style consistent with historic signage and it should be located with respect for the original location and neighbouring signs. The original location is generally on a sign panel just below a decorative cornice at the top of the ground level facade.

With the exception of distinctive neon signage which may be character-defining, highly illuminated signs are generally inappropriate for historic buildings. Where illumination is required it should be provided by lamps projecting from the facade.

Storefront Awnings

The historic shape and type of awning should be maintained. Retractable fabric awnings, where used historically, are appropriate visually, and provide weather shelter and signage opportunities.

The placement of the awning should respect the design of the storefront. For example, they should maintain the original configuration and location on the elevation with respect to piers, transoms and cornices.

Rigid fabric canopies, particularly those with internal illumination, are a recent development and as such are not appropriate for historic buildings.

Glazed rigid canopies were often part of larger commercial buildings and should be maintained or rebuilt where possible based on historic research.

Further Reading

Holdsworth, Deryck (ed.) for the Heritage Canada Foundation. *Reviving Main Street.* Toronto, University of Toronto Press, 1985.

Roger Du Toit Architects. *Planning and Design for Commercial Facade Improvements.* Toronto, Ont.: Ministry of Municipal Affairs, 1985.

U.S. Department of the Interior. *Window Awnings. Preservation Technical Note No. 7.* Prepared by Charles E. Fisher and Laura A. Muckenfuss. Washington, D.C.: National Park Service, 1984.

See also: References for Storefronts

New Additions to Historic Buildings

An attached exterior addition to an historic building changes its profile and can radically alter its appearance. Such additions should be considered only after it has been determined that the new use cannot be successfully met by altering non-character-defining interior spaces. If the new use cannot be met in this way, then an attached exterior addition is usually an acceptable alternative. New additions should be designed and constructed so that the character-defining features of the historic building are not radically changed, obscured, damaged or destroyed in the process of rehabilitation. New design should always be clearly differentiated so that the addition is not confused with original historic material.

Wherever possible, functions and services required for the new use should be accommodated in non-character-defining interior spaces rather than by a new addition.

If a new addition is required, it should be constructed with the least possible loss of historic material and in such a way that character-defining features are not obscured, damaged or destroyed.

The attached exterior addition should be located at the rear or on an inconspicuous side of an historic building; its size and scale should be limited in relationship to the historic building.

New additions should be designed in a manner that makes clear what is historic and what is new.

The attached exterior addition should be considered in both terms of the new use and the appearance of other buildings in the historic district or neighbourhood. Design for the new work may be contemporary or may reference design motifs from the historic building. In either case, it should always be clearly differentiated from the historic building and be compatible in terms of mass, materials and relationship of solids to voids and colour.

New additions, such as balconies and greenhouses, should be placed on non-character-defining elevations and should be limited in size and scale in relationship to the historic building.

Additional storeys, when required for the new use, should be set back from the wall plane and be as inconspicuous as possible when viewed from the street.

Not Recommended

- **Duplicating the exact form, material, style and detailing of the historic building in the addition so that the new work appears to be part of the historic building.**
- **Imitating an historic style or period of architecture in new additions, especially for contemporary uses such as garages or drive-throughs.**
- **Using the same wall plane, roof line, cornice height, material, siding lap or window type to make additions appear to be part of the historic building.**

Further Reading

Stephen, George. *Remodelling Old Houses Without Destroying Their Character.* New York, N.Y.: Alfred A. Knopf, 1973.

U.S. Department of the Interior. *Respectful Rehabilitation: Answers to Your Questions About Old Buildings.* Washington, D.C.: The Preservation Press, 1982.

Kalman, Harold. *The Sensible Rehabilitation of Older Houses.* Ottawa, Ont.: Canada Mortgage and Housing Corporation, 1979.

See also: Local design guidelines for heritage areas or zoning areas.

Building Interior

The Structural System

If features of the structural system are exposed such as loadbearing brick walls, cast iron columns, roof trusses, posts and beams, or stone foundation walls, they may be important in defining the building's overall historic character. Unexposed structural features that are not character-defining or an entire structural system may nonetheless be significant in the history of building technology. Therefore, the structural system should always be examined and evaluated early, in the project planning stage, to determine both its physical condition and its importance to the building's historic character or historical significance.

The recommended procedures should be followed in this sequence: assessment, maintenance, repairing and replacement; repair and replacement should be considered only after the previous measures have been followed.

✧ Assessment

Structural systems — and individual features of the systems — that are important in defining the overall historic character of the building should be recorded, inspected, retained and conserved. Examples include post and beam systems, trusses, cast iron columns, above-grade stone foundation walls, or loadbearing brick or stone walls

✧ Maintenance

The structural system should be protected and maintained by cleaning the roof gutters and downspouts, replacing roof flashing, keeping masonry, wood, and architectural metals in a sound condition, and assuring that structural members are free from insect infestation or fungal decay.

The physical condition of the structural system and its individual features should be examined, monitored and evaluated. For this process, non-destructive techniques, such as X-ray photography, are encouraged.

✧ Repairing

The structural system should be repaired by augmenting or upgrading individual parts or features. For example, weakened structural members such as floor framing can be spliced, braced or otherwise supplemented and reinforced. Care should be taken to avoid damage to character-giving features on the interior and exterior. A structural element should not be replaced if it can be repaired or reinforced.

✧ Replacement

Those portions or features of the structural system that are missing or have deteriorated extensively could be replaced in kind when there are surviving prototypes. Examples are cast iron columns, roof rafters or trusses, or sections of loadbearing walls. Substitute material should convey the same form, design and overall visual appearance as the historic features and, at a minimum, should be equal to its loadbearing capabilities. Substitute materials should be physically and chemically compatible with the historic system and materials.

Not Recommended

- **Removing, covering or radically changing features of structural systems which are important in defining the overall historic character of the building.**
- **Putting a new use into the building which could overload the existing structural system or installing equipment or mechanical systems which could damage the structure.**
- **Demolishing a loadbearing masonry wall that could be augmented and retained and replacing it with a new wall (i.e. brick or stone), using the historic masonry only as an exterior veneer.**
- **Leaving known structural problems untreated such as deflection of beams, cracking and bowing of walls or racking of structural members.**

- **Utilizing treatments or products that accelerate the deterioration of structural material such as introducing urea-formaldehyde foam insulation into frame walls.**

Further Reading

British Columbia Heritage Trust, *Seismic Building Upgrading for Vancouver's Gastown.* Technical Paper Series 8 prepared by Erol Karacebeyli and Brenda Wong. Victoria, B.C.: B.C. Heritage Trust, 1985.

Interior Spaces, Features and Finishes

An interior floor plan, the arrangement of spaces and built-in features and applied finishes may be individually or collectively important in defining the historic character of the building. Thus, their identification, retention, protection and repair should be given prime consideration in every rehabilitation project. Caution should be exercised in pursuing any plan that would radically change character-defining spaces or obscure, damage or destroy interior features or finishes.

The recommended procedures should be followed in this sequence: assessment, maintenance, protection, cleaning, repairing and replacement. Repair and replacement should be considered only after the previous measures have been followed.

Assessment

A floor plan or interior spaces that are important in defining the overall historic character of a building should be recorded, inspected, retained and conserved. This includes the size, configuration, proportion and relationship of rooms and corridors, the relationship of features to spaces, and the spaces themselves such as lobbies, banking halls, reception halls, entrance foyers, principal living rooms, theatres, auditoriums and those that have important industrial and commercial use.

Features and finishes that are important are to be similarly treated. These include columns, cornices, baseboards, fireplaces and mantel, panelling, light fixtures, hardware, flooring, wallpaper, plaster, ceramic tiles, paint and finishes such as stencilling, marbling and graining, as well as other decorative materials that accent interior features and provide colour, texture and patterning to walls, floors and ceilings.

Protection

Interior features should be protected from vandalism and arson prior to rehabilitation work by adequate protective fencing, hoarding, the installation of fire-alarm systems that are connected to local protection agencies.

Mantels, staircases, panelling and other interior features should be protected with heavy canvas or plastic sheeting.

✧ Cleaning

Use the gentlest means possible to remove damaged or deteriorated paints and finishes. Abrasive cleaning is appropriate only for some industrial or warehouse spaces where interior finishes are unremarkable. Caution should be exercised when using propane or butane torches for paint removal as they can damage historic material and pose a serious fire hazard when used indoors.

✧ Repairing

The historic materials should be reinforced when repairing interior features and finishes. Repair will also generally include the limited replacement in kind — or with compatible substitute material — of those extensively deteriorated or missing parts of repeated features when there are surviving prototypes such as stairs, balustrades, wood panelling, columns, decorative wall coverings, ornamental tin and plaster ceilings. Features that can be repaired should not be replaced. Substitute materials and replace-ment parts which do not convey the visual appearance of the surviving parts are to be avoided.

✧ Replacement

An entire interior feature or finish that is too deteriorated to repair could be replaced if the overall form and detailing are still evident to guide the new work. Examples could include wainscoting, a tin ceiling or interior stairs. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered. This should be physically and chemically compatible with and convey the same visual appearance as the historic material. An important character-defining feature that is unrepairable should be replaced to ensure that the qualities embodied by the feature continue to contribute to the overall quality and integrity of the interior space.

Not Recommended

- **Removing or radically changing features and finishes which are important in defining the overall historic character of the building.**
- **Installing new decorative material that obscures or damages character-defining interior features or finishes.**
- **Removing paint, plaster or other finishes from historically finished surfaces to create a new appearance.**
- **Applying paint, plaster or other finishes to surfaces that have been historically unfinished to create a new appearance.**
- **Stripping historically painted wood surfaces to bare wood, then applying clear finishes or stains to create a "natural look".**
- **Stripping paint to bare wood rather than repairing or reapplying grained or marbled finishes to features such as doors and panelling.**
- **Radically changing the type and finish or its colour, such as painting a previously varnished wood feature.**

Further Reading

APT Bulletin, Ottawa, Ont. contains specific articles of interior conservation (paints, wallpaper, panelling); consult their index.

Fisher, Charles E. III, ed. *The Interiors Handbook for Historic Buildings*. Historic Preservation Education Foundation, Washington, D.C., 1988.

Stephen, George. *Remodelling Old Houses Without Destroying Their Character*. New York, N.Y.: Alfred A. Knopf, 1973.

U.S. Department of the Interior, National Park Service, Preservation Assistance Division, Technical Preservation Services, Washington, D.C. publications:

Historic Interior Spaces *Preserving Historic Corridors in Open Office Plans*. Preservation Tech Note, 1985.

Preservation Brief 8: Rehabilitating Interiors of Historic Building, Identifying and Preserving Character-Defining Elements. Prepared by H. Ward Jandl, 1988.

Respectful Rehabilitation: Answers to Your Questions About Old Buildings. The Preservation Press, 1982.

❖ Mechanical Systems: heating, electrical, plumbing; transportation and communication

The visible features of historic heating, lighting and plumbing systems, together with elevators and communication systems, may sometimes help define the overall historic character of the building and should be retained and repaired, whenever possible. Less frequently, individual portions of a system or an entire system are significant in the history of building technology. Since the systems themselves (the compressors, boilers, generators and their ductwork, wiring and pipes) will generally either need to be upgraded or replaced in order to accommodate the new use and to meet code requirements, the identification of character-defining features or historically significant systems should take place together with an evaluation of their physical condition early in project planning.

The recommended procedures should be followed in this sequence: assessment, maintenance, repairing and replacement; repair and replacement should be considered only after the previous measures have been followed.

✧ Assessment

Features of early mechanical, electrical and plumbing systems that are important in defining the overall character of the building should be recorded, inspected, retained and conserved. These features could include radiators, vents, fans, grilles, plumbing fixtures, light fixtures, elevators, pneumatic tube systems.

✧ Maintenance

Protection and maintenance procedures should be adopted to service historically important mechanical, electrical and plumbing systems. To avoid moisture problems with the equipment of these systems, adequate ventilation should be provided for attics, crawlspaces and cellars.

✧ Repairing

Mechanical systems should be repaired where feasible by augmenting or upgrading system parts. This could include installing new pipes and ducts, rewiring or adding new compressors or boilers.

✧ Replacement

Those visible features of mechanical systems that are missing or extensively deteriorated, should be replaced in kind — or with compatible substitute materials — when there are surviving prototypes. Examples include ceiling fans, switchplates, radiators, grilles or plumbing fixtures.

The installation of new systems should cause the least alteration to the floor plan, elevations and interior spaces. Vertical chases and dropped ceilings to accommodate such systems should not destroy character-giving features or obscure window openings.

New heating or air-conditioning systems should consider the effect of changes in temperature, humidity and vibrations on the historic building. The equipment of such systems (new heating or air-conditioning units) should be discreetly located to be unobtrusive when viewed from the front or public right-of-way. Window mounted air-conditioning units should not damage historic fabric.

Further Reading

Ferro, Maximilian L. *Electrical Wiring and Lighting in Historic American Buildings: Guidelines for Restoration and Rehabilitation Projects.* New Bedford, Mass.: AFC/ A. Norteck Company, 1984.

Vila, Bob. *Bob Vila's This Old House.* Toronto, Ont.: Clarke-Irwin & Co. Ltd., 1981

❖ Energy Retrofitting

Some character-defining features of a historic building or site such as cupolas, shutters, transoms, skylights, sun rooms, porches and plantings also play a secondary energy conserving role. Therefore, prior to retrofitting historic buildings to make them more energy efficient, the first step should always be to identify and evaluate the existing historic features to assess their inherent energy conserving potential. If it is determined that retrofitting measures are necessary, then such work should be carried out with particular care to ensure that the building's historic character is preserved.

The recommended procedures should be followed in this sequence: building site, masonry/wood/architectural metals, roofs, windows, entrances and porches, interior features, new additions and mechanical systems.

✧ Building Site

Plant materials, tree and landscape features which act as passive energy conservation devices should be retained. Examples include shade trees, hedges and wind breaks.

✧ Masonry/Wood/Architectural Metals

Thermal insulation should be installed in attics and in unheated cellars and crawlspaces to increase the efficiency of the existing mechanical systems.

Insulating material should be placed on the inside of historic masonry walls to increase energy efficiency. This should be done only when there is no character-defining interior moulding around the window or other interior architectural detailing.

✧ Windows

The inherent energy conserving features of a building should be utilized by maintaining windows and louvered blinds in good operable condition for natural ventilation.

Thermal efficiency should be improved with weatherstripping, storm windows, caulking, interior shades, and, if historically appropriate, blinds and awnings. New thermal sash units with false or clip-on muntins should not replace historic multi-paned sash.

Interior storm windows can be installed with air-tight gaskets, ventilating holes and/or removable clips to ensure proper maintenance and to avoid condensation damage to historic windows. Exterior storm windows that are appropriate can be installed to improve energy efficiency.

Lightly tinted glazing can be used on non-character defining elevations. Reflective glazing is not recommended as it creates a markedly different and usually inappropriate character to historic buildings.

✧ Entrances and Porches

The inherent energy conserving features of a building should be used by maintaining porches and double vestibule entrances in good condition so that they can retain heat or block the rain and sun and provide natural ventilation. The enclosure of historic open porches is often disruptive to the character and reduces the effects of passive energy conservation.

Further Reading

Neilson, Sally E. *Insulating the Old House: A Handbook for the Owner.* Portland, Maine: Greater Portland Landmarks, Inc., 1977.

U.S. Department of the Interior. *Preservation Brief 3: Conserving Energy in Historic Buildings.* Prepared by Baird M. Smith AIA. Washington, D.C.: Technical Preservation Services, Preservation Assistance Division, National Park Service, 1978.

Weaver, Martin E. "Energy Efficiency in Older Buildings" *Canadian Heritage,* February *1981.* Ottawa, Ont.: Heritage Canada Foundation.

See also: References for Windows

Health, Safety and Building Code Requirements

It is often necessary to make modifications to a historic building so that it complies with current health, safety and building code requirements. Such work should be carefully planned and undertaken so that it does not result in a loss of character-defining spaces, features and finishes.

The historic building's character-defining spaces, features and finishes should be identified so that code-required work will not result in their damage or loss.

Health and safety codes, including seismic codes and barrier-free access requirements should be complied with in such a manner that character-defining spaces, features and finishes are preserved.

Local code officials should be consulted to investigate alternative life-safety measures, variances or equivalencies that are available under some codes so that alterations and additions to historic buildings can be avoided.

Barrier-free access should be provided by removable or portable, rather than permanent, ramps.

Seismic reinforcement and upgrading should be undertaken in a manner than avoids damage to the structural system and character-defining features.

Historic stairways and elevators should be upgraded to meet health and safety codes in a manner that assures their preservation.

Sensitively designed and integrated fire suppression systems should be installed, especially in wood frame structures, instead of applying fire-resistant sheathing to character-defining features.

Fire-retardant coatings, such as intumescent paints (which expand when heated), should be applied to wood and steel surfaces when the fire-resistance rating has to be improved.

New stairways or elevators that are needed to meet life-safety codes should be added in a manner that preserves adjacent character-defining spaces.

Code-required stairways or elevators that cannot be accommodated within the historic building should be placed in a new exterior addition. Such an addition should be located at the rear of the building or on an inconspicuous side; its size and scale should be in relationship to the historic building.

Further Reading

ARA Architects Inc. *By-Law Requirements for Heritage Buildings.* Vancouver, B.C.: City of Vancouver Planning Department, 1987.

British Columbia Heritage Trust. *Fire Prevention in Heritage Buildings.* Technical Paper Series 7 prepared by Gail Susssman, Victoria B.C.: B.C. Heritage Trust, 1983.

British Columbia Heritage Trust. *Seismic Building Upgrading for Vancouver's Gastown.* Technical Paper Series B prepared by Erol Karacabeyli and Brenda Wong. Victoria, B.C.: B.C. Heritage Trust, 1986.

Ministry of Municipal Affairs. *The British Columbia Code, 1985.* Victoria, B.C.: Building Standards Branch, M.M.A., 1985.

National Research Council. *National Building Code of Canada, 1985.* Ottawa, Ont.: Associate Committee on the National Building Code, N.R.C. of Canada, 1985.

Regulating Existing Buildings, entire issue. *APT Bulletin.* Vol. VIII No. 2. Ottawa, Ont.: Association for Preservation Technology, 1981.

See also: Various municipal codes, buildings and zoning by-laws.